Dear Editor,

We thank you for accepting our article on the socket-shield technique and we feel honored that we could contribute to Journal of Oral Implantology. As open-minded, evidence-based researchers, we welcome all the constructive criticism on our accepted manuscript. We have read the points put forth about our paper by our colleagues. Scientific literature should be based on healthy discussion; we are not against any individuals or techniques. Rather, as researchers of the healthcare profession, we demand concrete evidence on proposed techniques before they are routinely used for patients. Our paper is just a summary of the current findings on a technique.

Below is a point-by-point response to the queries raised:

We have done our best to provide a scientifically accurate picture of the current evidence on the socket-shield technique. The research questions put forth are clearly mentioned, point-by-point, in the introduction. Further, included is a clearly defined, focused PICO (population, intervention, control, outcome) question: “What is the long-term clinical prognosis and the biologic plausibility of the socket-shield technique used for preservation of buccal/proximal/crestal bone for implant treatment in humans, on the basis of clinical, histologic and radiologic evaluation.” Since this is the first systematic review on the technique, no previous protocol exists for this particular systematic review. We have provided a detailed protocol outlining each step of the process as per the PRISMA guidelines (Moher et al 2009). A total of 23 studies were selected on the subject. Animal histologic and clinical studies were assessed separately. Two of the twenty-three studies documented both animal histologic studies as well as patient-based clinical findings and each of these components were assessed separately.

The “socket-shield” technique is a relatively new term that has not been specifically defined in detail by any governing body and is not a recognized MeSH term (Medical Subject Heading; https://meshb.nlm.nih.gov/). Our inclusion and exclusion criteria explicitly state which parameters we used to ascertain which studies could be selected for review. The basic biological principle is the focus on intentionally retaining a part of the root piece to preserve and promote bone formation. Thus, we feel the same principle is employed when a root piece is intentionally retained to preserve/promote bone formation. Thus, we feel that the inclusion of this study is justified. Further, the authors of this study clearly anticipated bone formation in areas adjacent to the implant and the intentionally retained root surfaces as evidenced by their statement in the introduction: “As the only cells populating this wound area are derived from the bone compartment that consists of bone cells, bone marrow cells and blood cells, these are the only cells that determine the pattern of healing. Direct apposition of bone tissue on the titanium surface would be the outcome, provided that established surgical protocols are respected.”

Also, the authors of this paper mention the following as a part of their aim: “In addition, by using differently prepared titanium surfaces, differences in cell attachment and peri-implant tissue formation were evaluated in vivo.” Thus, this study clearly looked at the formation of bone along with other periodontal tissues around implants. Another important aspect of this study that the authors of the letter have missed was the design. Although Parlar et al (2005) intentionally prepared root pieces in a circumferential pattern they involved both the buccal and the proximal surface of the implant. On a biological level, the same principle is employed when a root piece is intentionally retained to preserve/promote bone formation. Thus, we feel that the inclusion of this study is justified. Further, it cannot be ignored that all implants in the study failed to osseointegrate. By excluding this study, we would underestimate the actual number of failures associated with this technique, and would possibly lose concrete evidence that may caution us against the use of this technique.

Response to points 2 and 3

The same argument holds true for the study by Troiano et al (2014) and Guirado et al (2016). They used a circumferential shield that involved the buccal as well as the proximal surfaces of the root piece. The focus for this technique was once again the biological principle and not the technical pattern of the shield.

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Hence, this study was included because it followed the biological principle of the socket-shield and assessed its outcome.

Response to point 4

The bone loss has not been overstated. Because the studies by Parlar et al (2005) and Troiano et al (2014) assessed the bone condition around the socket-shield, the adverse effects and complications also have to be reported. The amount of acceptable crestal bone loss varies considerably among studies.\textsuperscript{1–4} Some of these well-designed double blinded randomized controlled trials\textsuperscript{3} in the maxillary aesthetic region have demonstrated excellent bone stability ranging from bone gain of $+0.18$ mm to a minimal loss of $-0.45$ mm at 2 years after immediate implant placement and immediate temporization. Any loss whether acceptable or not, remains to be an adverse effect/complication and must be reported. Most studies in the review had significant bone loss in their short follow-up periods and it was our duty to report these findings. The study by Sirompas et al (2014) demonstrated a loss of $0.18 \pm 0.09$ on the mesial and $0.21 \pm 0.09$ on the palatal that needed to be reported even if it falls under the acceptable category. However, it is important to note that it was not considered while calculating the percentage of adverse effects/complications. We considered the remaining studies. Thus, the presented percentage of adverse effects/complications is accurate based on the analyzed studies. What should be noted is that the percentage reported in the review might be an underestimation of the actual complications. Given that most studies have been case reports, there is a possibility of a strong bias against the publication of cases with grave complications/adverse effects. Additionally, the authors of the letter compare the socket-shield with results from those with conventional immediate placement based solely on bone loss seen in case reports. Such a comparison is obviously flawed and cannot be commented on until well-designed RCTs specifically addressing these techniques are undertaken.

Response to point 5

In the study by Cherel and Ettiene (2014), the root fragment was seen once the provisional crowns were removed at 4 months. The classical literature points out that retained root pieces might become symptomatic, (6.2% in a sample size of 2000 surgical sites became symptomatic according to Helsham [1960]) more so if they are exposed. Hence, it is prudent to include the exposed root fragment as an adverse effect/complication.

Response to point 6

Contrary to what the authors of the letter have mentioned about the study by Mitsias et al (2015), probing pocket depths of 4 mm were reported at 3 months, not 3 years, and there is no clear mention of whether it was one site or multiple sites in the paper. Further, there is no mention of the pocket depth at 3 years follow-up. Thus, the authors of the letter have reported inaccurate findings. Additionally, the authors of this study have failed to mention if there was any bleeding on probing at 3 months and 3 years. We understand that probing depths around implants and natural teeth differ. However, the literature is divided on the acceptable probing depths for implants.\textsuperscript{5–8}

Response to point 7

The authors of the letter have quoted again the following statement out of context: "Further, there is a possibility that loss of the socket-shield either by resorption or due to extraction following infection, may lead to loss of the bone it preserves, and may predisposing the implant surface to exposure.\textsuperscript{7}" The entire paragraph preceding this statement provides an evidence based hypothesis of what would happen if the socket-shield fails. The socket-shield is based on the principle that the buccal/proximal bone remains intact so long as the root-piece remains in place; loss of this barrier may result in the loss of the maintained bone. The evidence indicates that this would be the most likely fate of the implant in such a scenario.

Response to point 8

The authors of the letter are clearly unaware that a special modification of the ARRIVE guidelines by Vignoletti and Abrahamsson (2012) has been successfully used in the literature to assess animal as well as human experimental studies specifically related to implant dentistry. This is the most exhaustive publication on the quality of reported experimental studies in implant dentistry. As case reports and series are low-quality evidence, it would be nearly impossible to assess and report their quality. For this reason, we have included only 5 studies for quality assessment as these were the only experimental studies in this review that fit the criteria of the modified ARRIVE guidelines.

We hope we have addressed all the points raised by our colleagues. True scientific progress can only happen through healthy discussion and mutual respect among professionals. Although we welcome constructive criticism of our paper, the manner in which the authors of the letter have made baseless accusations of misinterpretation of the data is indeed disheartening. However, we would like to thank the authors for providing their financial conflict of interest, by stating that they lecture on the socket-shield technique as a part of continued education.

Thank you once again for providing us with the opportunity of addressing these issues. The text of the original paper in our opinion is clear and self-explanatory. We have tried our best to provide an unbiased assessment of this technique. We feel strongly that the current evidence supporting this technique seems extremely weak. Once again, we would like to declare that we have no conflict of interests on the subject. We would be more than happy to clarify any further queries.

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REFERENCES


